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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,465	07/18/2003	Hiroyoshi Funato	R2184.0056/P056-B	1137

24998 7590 08/29/2006

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EXAMINER	
CHANG, AUDREY Y	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 08/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,465	FUNATO, HIROYOSHI	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _23 June 2006_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _30-44,46,48 and 49_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _30-44, 46, 48 and 49_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on June 23, 2006, which has been entered into the file.
- By this amendment, the applicant has amended claims 30, 40, 41, 43, 48 and 49.
- Claims 30-44, 46 and 48-49 remain pending in this application.
- The rejection to claims 30-42, 43-46, and 48 under 35 U.S.C. 112, first paragraph with respect to the "incident reflection beam" is withdrawn in response to applicant's amendment.

Specification

1. The amendment filed **December 8, 2005** is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **claims 30 and 43 have been amended** to include the feature of "unpatterned substrate". The specification lacks **explicitly** teachings for supporting this feature.

Applicant is required to cancel the new matter in the reply to this Office Action.

The applicant is respectfully reminded that a figure DOES NOT give literal description of the claimed feature that is not explicitly stated in the specification. The figure demonstration (16A to 16F and 19A-19H) does not explicitly and literally state that the substrate is unpatterned in particular the applicant uses the same figure demonstration to give the support for the substrate to be exposed. If the substrate is exposed, such as exposed in the photo process for masking the diffraction grating then it is impossible for the substrate to be unpatterned since the exposure will

cause certain irregularity on the substrate no matters small or large. Applicant's arguments therefore are contradicting.

Response to Amendment

2. The amendment filed December 8, 2005 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **amended claims 48 and 49** have included the phrase "wherein a top surface portion of the substrate is exposed". The **specification** fails to give **explicit support** for such and fails to teach **what exactly** is this top portion being exposed to.

Applicant is required to cancel the new matter in the reply to this Office Action.

The applicant is respectfully reminded that the figure demonstration does not give literal support for the claimed subject matters. In particular, it does not give the support as to what exactly the top of the substrate is exposed to. Is it exposed to air or exposed to the exposure light used to mask the diffraction grating or the expose to the process for removing the undesired mask? The figures simply fail to disclose such.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 48 and 49 are rejected under 35 U.S.C. 112, first paragraph,** as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the

specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on newly added matters are set forth in the paragraphs above.

Claim Objections

5. **Claims 48 and 49 are objected to because of the following informalities:**

(1). Claims 48 and 49 includes the phrase "wherein a top surface portion of the substrate is exposed" that is confusing and indefinite since it is completely not clear the top portion of the substrate is exposed to what?? Also the phrase "forming an isotropic overcoat ... and on said exposed portion of the top substrate" recited in claims 48 and 49 is extremely confusing and indefinite since it is not clear what does this phrase means. *This objection has already present in the previous Office Action. The applicant is respectfully noted that the arguments fails to amend the claims to explicitly state with respect to what the top of substrate is exposed to.*

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 30-32, and 35-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Takeda et al (PN. 5,739,952) in view of the patent issued to Nakamura et al (PN. 5,244,713) and Takeda et al (PN. 5,793,733).**

Takeda et al teaches a *polarization beam splitter* that is comprised of a *holographic grating pattern* (Figures 1-4) formed with *birefringence film* (2) laying on a *substrate* (1). The birefringence layer (2) has an anisotropic property such that the *refractive indices* (n_o and n_e) of the layer for light propagates in the *ordinary* direction (S-polarization direction) and *extraordinary* direction (P-polarization direction) are different from each other. This difference in refractive indices will make the holographic grating imparting *different* phase value to the S-polarization and P-polarization components of an incident light which therefore will diffract the two components of light differently.

Takeda et al teaches that the holographic grating pattern of the polarization beam splitter is formed by first *depositing* a monomeric diacetylene film (i.e. an organic polymer film) on a *substrate* and then polymerized it to form a polymer of diacetylene, which is an *organic polymer material*. The polymer material is then *rubbed* in *one direction to form the birefringence layer*. Takeda et al further teaches that a *resist* for forming a grating is applied on top of the polydiacetylene film to *form the grating pattern* in the film, (please see columns 8-9). The grating pattern is holographic because Takeda et al teaches explicitly that the grating may also be formed by two-beam interference method, (please see column 9, lines 1-5).

This reference has met all the limitations of the claims with the exception that although it teaches that polymer film is *rubbed* in one direction but it does not teach explicitly that the polymer film is uni-directionally stretched and heated to form the birefringence film. However using uni-directional stretching and heating process to form birefringence film from an *organic polymer* film is rather well known in the art as demonstrated by the teachings of **Nakamura** et al wherein an *organic polymer film* is **heat treated and then uniaxially stretched, (i.e. uni-directionally stretched)** to make the film have *optimum* birefringence, (please see column 4, lines 6-26). Nakamura et al teaches that polymer materials that can be made birefringence by heat treatment and stretching method include *polycarbonates, polystyrene and polyamide resins*, (please see column 2, lines 53-69). It would then have been obvious to

one skilled in the art to use the well-known heating and uniaxial stretching method and the well known *organic polymer* materials as an alternative materials and method to make the *birefringence* film that can be used as the birefringence layer for the holographic grating of Takeda et al for the benefit of using a manufacture method to obtain *optimum* birefringence of the film, and to cut manufacture cost by using conventionally accessible and known polymer materials.

Although these references do not teach explicitly that the organic polymer film is applied on a substrate and then removed from the substrate and do not teach, the birefringence film is reattached to the substrate via an *adhesive* layer however such processes have to be either inherently met by the disclosures of Takeda et al or disclosure of Nakamura et al in the step of forming the organic polymer film before the heating and stretching treatment steps and in the step of adhering the birefringence film to the substrate or obvious modifications to one skilled in the art since the organic polymer film has to be **first** formed on some substrate and the substrate cannot be included in the heating and stretching steps for it will interrupt such treatments for the film to make the birefringence film. Furthermore, whether to use an adhesive layer to attach the birefringence film layer to the substrate or not really provides no patentable distinction since the final result, namely having the birefringence film layer *attached* to the substrate, is achieved by the disclosure of Takeda et al. Also Takeda et al specifically teaches that equally good result will be achieved by either having an adhesive layer between of the birefringence layer and the substrate or not having one, (please see column 27, lines 10-15). Such modification therefore is considered as obvious matters of design choice to one skilled in the art for making the adhesion between the two by desired manner.

With regard to the feature concerning the periodic grating pattern formed by placing photo-resist and mask, this reference does not teach such explicitly. Takeda et al ('952) teaches that the periodic grating is formed by using two beams interference method but does not teach explicitly that it is formed by using photo-resist mask. However using photo-resist layer with a mask to form periodic grating pattern

is a standard method in the art as demonstrated by the teachings of **Takeda** et al ('733), wherein a polarization grating is formed by placing a photo-mask (14) formed in a photo-resisting material and placing such photo-mask over the birefringence layer (12) and using UV irradiation to form the periodic grating pattern, (please see Figures (2a) to 2(c), column 5, lines 5-23). The photo-mask (14) has to be formed in a photo-resist material in order for it to stand the high photo energy of the UV beam. It is implicitly true that the substrate (11, figures 2(a) to 2(c)) ***remains unpatterned.*** It would then have been obvious to one skilled in the art to apply the teachings of Takeda et al ('733) as an alternative means for forming the desired grating pattern in the birefringence layer for the benefit of perhaps providing the capability of mass producing such holograms by using a standard photo-mask.

With regard to the feature concerning receiving a light beam, Takeda et al ('952) and Takeda et al ('733) **both** teach that the polarization hologram is capable of diffracting light beam based on its polarization and wavelength, such is a direct result of the diffraction equations stated in equations such as 26 and 28.

Claim 30 includes the feature that the transparent substrate remains unpatterned. Takeda et al ('952) teaches explicitly that the substrate remains **unpatterned** wherein the diffraction grating is formed in the birefringent film (2, Figure 4) only. Takeda et al ('733) also teaches that the substrate remains **unpatterned**, (please see Figure 2(c)).

With regard to claim 31, in a different embodiment Takeda et al teaches that an isotropic layer (20, Figure 12) can be formed over the grating patterned birefringence film (2) to enclose the birefringence layer.

With regard to claim 32, Nakamura et al reference teaches that the suitable polymers that can be heat stretched to form birefringence film includes polycarbonate, polystyrene and polyamide film, (please column 2, lines 53-69). The modification would have been obvious to one skilled in the art since it has

been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With regard to claim 35, Nakamura et al teaches that the heat stretching process is done at a temperature between 190 to 230 ^{0}C. Although it does not teach explicitly that it is heated at 350 ^{0}C but such feature is considered to be obvious modification since at either temperature the same result namely heating the organic polymer film in the processes of forming it a birefringence film is achieved.

With regard to claims 37-39, these references teach many different examples of birefringence film with different refractive index in the ordinary and extraordinary direction, however they do not teach explicitly to have the particular values claimed in the claims. But such modification is considered to be obvious matters of design choices to one skilled in the art to make the birefringence film with desired refractive indices so that the polarization beam splitter with the holographic grating pattern will behave as desired.

With regard to claims 40 and 41, Takeda et al teaches that the **optical path phase difference** for the ordinary and extraordinary light paths for the grating patterned birefringence film with the grooves of the grating pattern formed with isotropic material are denoted by equations 26 and 28, i.e.

$OPD(o) = (n_o - n_c)* d2*k$, $OPD(e) = (n_e - n_c)* d2*k$,

Wherein n_o and n_e are the refractive indices of the birefringence film for the ordinary and extraordinary direction and n_c is the refractive index of the isotropic layer and d2 is the grating height and k is $2\pi/\lambda$, λ being the wavelength, (k is **typographically wrong** as stated in column 14 line 3 but it should be defined as $2\pi/\lambda$, as in columns 6, line 33, column 22, line 61 etc. in order to keep the equations dimensionally correct). Takeda et al teaches that in order for the ordinary light or the extraordinary light to be not diffracted by the grating the **optical path phase difference** has to be an even multiple of π, i.e. $2m\pi$, and in order for them to be diffracted the **optical path phase difference** has to be an odd multiple of π, i.e. $(2m+1)\pi$. Takeda et al teaches that the beam splitter including the holographic grating is

designed to totally diffract one component of the beam and leaves the other not diffracted, (please see column 7, lines 18-24). This then requires one of the optical path difference equals $2m\pi$ and the other equals $(2m+1)\pi$. This then gives the following results:

$OPD(o) = 2m\pi = (n_o - n_c)^* d2^*k$, which gives $(n_o - n_c) d2 = m \lambda$, and

$OPD (e) = (2m+1)\pi = (n_e - n_c)^* d2^*k$, which gives $(n_e - n_c)^* d2 = (2m+1) \lambda$,

Or,

$OPD(o) = (2m+1)\pi = (n_o - n_c)^* d2^*k$, which gives $(n_o - n_c) d2 = (2m+1) \lambda$, and

$OPD (e) = 2m\pi = (n_e - n_c)^* d2^*k$, which gives $(n_e - n_c)^* d2 = m \lambda$.

With regard to claim 42, these references do not teach explicitly to use spin coating for applying the organic polymer to the substrate, however such process is extremely well known in the art, such modification would have been obvious to one skilled in the art as an alternative means to apply the polymeric film on the substrate.

8. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Takeda et al ('952) and Nakamura et al and Takeda et al ('733) as applied to claim 30 above, and further in view of the patent issued to Yoshimi et al (PN.5,245,456) and Yamamoto et al (PN. 6,040,418).

The polarization beam splitter comprises a holographic grating taught by **Takeda** et al in combined with the teachings of **Nakamura** et al as and Takeda et al ('733) described for claim 30 above have met all the limitations of the claims. These references however do not teach explicitly that the organic polymer material comprises polyimide and the polyimide film is obtained with the claimed acid and solvent solution. **Yoshimi** et al in the same field of endeavor teaches that polyimide resin shows positive birefringence which is then a suitable birefringence polymer material. **Yamamoto** et al in the same field of endeavor teaches that it is standard knowledge in the art to prepare polyimides using

polyamide acid with solvent, (please see columns 1 and 2). It would then have been obvious to one skilled in the art to apply the teachings if Yoshimi et al and Yamamoto et al to prepare polyimide film as an alternative suitable polymer material for the birefringence film. Since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

9. **Claims 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeda et al (PN. 5,739,952) in view of the patent issued to Nakamura et al (PN. 5,244,713).**

Takeda et al teaches a *polarization beam splitter* that is comprised of a *holographic grating pattern* (Figures 1-3) formed with *birefringence film* (2) laying on a *substrate* (1). The birefringence layer (2) has an anisotropic property such that the *refractive indices* (n_o and n_e) of the layer for light propagates in the *ordinary* direction (S-polarization direction) and *extraordinary* direction (P-polarization direction) are different from each other. This difference in refractive indices will make the holographic grating imparting *different* phase value to the S-polarization and P-polarization components of an incident light which therefore will diffract the two components of light differently.

This reference has met all the limitations of the claims with the exception that although it teaches that the birefringence film comprises an organic polymer film is *rubbed* in one direction but it does not teach *explicitly* that it is uni-directionally stretched birefringence film. However using uni-directional stretching and heating process to form birefringence film from an *organic polymer* film is rather well known in the art as demonstrated by the teachings of **Nakamura** et al wherein an *organic polymer film* is **heat treated and then uniaxially stretched, (i.e. uni-directionally stretched)** to make the film have *optimum* birefringence, (please see column 4, lines 6-26). It would then have been obvious to one skilled in the art to use the well-known heating and uniaxial stretching method and the well known *organic polymer* materials as alternative materials and method to make the birefringence film to be used

as the birefringence layer for the holographic grating of Takeda et al for the benefit of using a manufacture method to obtain *optimum* birefringence of the film, and to cut manufacture cost by using a conventionally accessible and known polymer materials.

With regard to the feature having the depth of the grating is essentially equal to a thickness of the birefringence layer. This is corresponding to the situation of making the thickness of d3 being zero as in equations (22 and 23, to Figure 4) of Takeda et al ('952). Such modification would certainly have been obvious to one skilled in the art for the benefit of making the polarization grating with less material and therefore less cost. Furthermore, it has been held when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involve only routine skill in the art. In re Aller, 105 USPQ 233.

Claim 43 has been amended (in Amendment filed December 8, 2005) to include the feature of "*unpatterned* substrate". Takeda et al teaches explicitly that the substrate is unpatterned as shown in Figures 4, 9(a) and 9(b)).

With regard to claim 44, in a different embodiment Takeda et al teaches that an isotropic layer (20, Figure 12) can be formed over the grating patterned birefringence film (2) to enclose the birefringence layer.

10. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Takeda et al and Nakamura et al as applied to claim 43 above, and further in view of the patent issue to Iwatsuka et al (PN. 5,245,471).

The polarization beam splitter including the holographic grating taught by **Takeda** et al in combination with the teachings of **Nakamura** et al as described for claim 43 above have met all the limitations of the claims. These references however do not teach to have the features of having a second substrate formed with an adhesive layer as the isotropic layer. **Iwatsuka** et al in the same field of

endeavor teaches a polarizer including grating pattern formed in birefringence layer wherein a second substrate (19, Figure 6E) is formed on top of an adhesive layer (18) serves as the isotropic layer that fills the grooves of the grating patterned birefringence layer (4). It would then have been obvious to one skilled in the art to apply the teachings of Iwatsuka et al to modify the design of the beam splitter of Takeda et al accordingly for the benefit of providing the polarization beam splitter with easy handling.

11. Claims 48 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Iwatsuka et al (PN. 5,245,471) in view of the patent issued to Nakamura et al .

Iwatsuka et al teaches a method for forming a polarization hologram that is comprised of the step of providing a *substrate* (1) and forming a *birefringence layer* (2) over the substrate. The method further comprises the step of forming a *photo-resist mask* (3) over the birefringence layer and forming a *periodic grating pattern* on the birefringence film without etching the substrate. The method then comprises the step of *removing* the photo-mask and forming an *isotropic* layer (4, 9 , 11 or 18) over the patterned birefringence layer, (please see Figures 1, 2(A) to 2(E) and 6(A) to 6(E)).

This reference has met all the limitations of the claim with the exception that it does not teach explicitly that the birefringence layer is an uni-directional stretched organic polymer layer. However birefringence layer formed by uniaxially stretching organic polymer layer is very well known in the art as demonstrated by the teachings of **Nakamura** et al wherein an *organic polymer film* is *heat treated and then uniaxially stretched, (i.e. uni-directionally stretched)* to make the film have *optimum* birefringence, (please see column 4, lines 6-26). It would then have been obvious to one skilled in the art to apply the teachings of **Nakamura** et al to use a birefringence layer that is comprised of an uniaxially stretched polymer layer for the benefit of allowing different materials being used to form the polarization grating and at same time using a birefringence layer that is made to have *optimized* birefringence which is essential for the function of the polarization hologram.

With regard to the formula for designing the polarization hologram, as recited in claim 48, Iwatsuka et al teaches such formula explicitly. Iwatsuka et al teaches that if the isotropic layer (11) has refractive index of (n2) and the birefringent layer (10) has refractive index for one polarization, which may be p-polarization, is (n1+) and for the other polarization, which may be s-polarization, is (n1-) and the thickness of the grating pattern of the polarization hologram is "d" then the following equations holds:

[(n1+) -(n2)]*d = N1* L and [(n1-) - (n2)] *d =N2* L, (L being the wavelength), (pleas see columns 4-5).

With regard to claim 49, the periodic grating pattern has different refractive indices for two orthogonal polarization direction, in the birefringent region (2).

Claims 48 and 49 have been amended to include the feature "a top surface portion of the substrate is exposed" and the isotropic overcoat is "over the patterned stretched organic polymer layer and on said exposed portion of the top surface". These claims fail to specify the top surface portion of the substrate is exposed to what this feature is therefore being examined as the top surface portion is exposed to the organic polymer layer. **Iwatsuka** et al teaches **explicitly** that the polarization hologram is formed by using a photo-resist mask (3) on a birefringent film (2), which is the organic polymer layer, that is on top surface portion of the substrate (1). After the photo-resist photomask is removed, an *isotropic adhesive layer* (18, Figure 6(E)) serves as the *isotropic overcoat* covers both the birefringent diffraction pattern (4) and the exposed top portion of the substrate, (please see Figure 6(E)).

Double Patenting

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 43-44 and 46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,618,344.

Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claimed a polarization hologram with grating pattern formed in a birefringence layer such that the birefringence layer is a stretched organic polymer film. The feature concerning the birefringence layer being *uni-directionally stretched* as recited in claim 43 of instant application does not differentiate the instant application from the cited patent since birefringent layer comprises uni-directional stretched or uniaxially stretched polymer film is very well known and standard in the art. And it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Response to Arguments

14. Applicant's arguments filed on **June 23, 2005** have been fully considered but they are not persuasive. The newly amended features have been fully considered and they are rejected for the reasons stated above.

In response to applicant's arguments which state that the cited Takeda ('952) teaches a method for orienting the birefringence film by rubbing in one direction to easy the fabrication therefore would not be suggesting or motivated to substitute to a more difficult and labor intensive process of Nakamura, the examiner respectfully disagrees. Firstly, Takeda ('952) does not teach to rub the film in one direction is

to ease the manufacture process, (please see column 8, lines 42-28), rather it just teaches *one way* of uni-directionally stretching the film to form the birefringent film. The Nakamura reference teaches a method for uni-directional or uni-axial (one direction) stretching the birefringent film in company with heat treatment to provide the optimum birefringence for the film and dimensional stability for the film, (please see column 4, lines 6-19 and 41-45) which give the EXPLICIT motivation for one skilled in the art to adopt the fabrication method of Nakamura to ensure the optimum birefringence (which is essential for this polarization hologram to work) and to ensure the dimensional stability of the uni-directional stretched film. One skilled in the art would *certainly* be motivated to adopt the method of Nakamura for the explicit stated benefit. The uni-directional stretching and heat treatment taught by Nakamura does not conflict the intended one-directional orientation of the birefringent film by one directional rubbing of Takeda ('952). It rather enhances the one-directional orientation intent for the birefringent film with optimum birefringence. The applicant is respectfully requested to provide reasons why and the substantial proof that the method taught by Nakamura reference will be labor intensive and difficult and one skilled in the art will not be motivated to adopt. Applicant is also respectfully noted the arguments concerning the **oriented polydiacetylene** film of Takeda ('952) are irrelevant to process of making it *oriented*. The prima facie case of obviousness is therefore served since the Nakamura reference teaches explicitly about the motivation.

In response to applicant's arguments concerning the optical path *phase* difference OPD, recited in the cited Takeda ('952) and Office Action being wrong, the examiner respectfully disagrees, for the *wave number k* in the formula should be $2\pi/\lambda$, to make the equation with the correct dimension. Takeda ('952) has correctly defined k being $2\pi/\lambda$, in column 6, line 33, while the expression for k in column 14 line 3 is a typographic error. One skilled in the art would have the knowledge that by *dimensional analysis* for the optical *phase difference*, OPD(o) and OPD(e), which should be measured in term of *radians*, or "π",

$OPD(o) = (2m+1)\pi = (n_o - n_c)^* d2^*k$, which gives $(n_o - n_c)\, d2 = (2m+1)\, \lambda$, and

$OPD\,(e) = 2m\pi = (n_e - n_c)^* d2^*k$, which gives $(n_e - n_c)^*\, d2 = m\, \lambda$,

k should have the correct form as $(2\pi/\lambda)$ to properly ensure the phase difference measured in term of radians or "π". The equations therefore are correct, with the correct k definition as defined in column 6 of the reference and meant to be the case for the rest of the reference.

In response to applicant's arguments concerning the Figures 2(A) to 2(E) of cited Iwatsuka reference does not show the top of the substrate is exposed, which therefore differs from the instant application, the examiner respectfully disagrees for the reasons stated below. Firstly the claims and specification fail to disclose the top of substrate is exposed to what so such feature cannot really be examined and cannot really be compared with the cited reference. Secondly, if these claims mean the substrate is exposed without being covered by the birefringence film then Figures (6A to 6E) of cited Iwatsuka reference teaches such explicitly.

In response to applicant's arguments which state that the cited Iwatsuka et al reference does not teach the relationship claimed in claim 48 for governing the polarization diffraction grating, the examiner respectfully disagrees. The applicant **being one skilled in the art** has to know that the refractive indices n1+ and n1- are referred to refractive indices for **orthogonal** polarization components of the incident light, (please see column 4, lines 14-16), which means one is for p-polarization component and the other is for s-polarized component. The relationship disclosed by the cited Iwatsuka et al reference (equations III and IV) therefore satisfies the equation claimed. Furthermore, the equations of Iwatsuka et al have to satisfy the claimed relationship since the polarization hologram disclosed by the Iwatsuka et al does diffract the polarized light in the **same way** as the instant application namely only the (+) polarization component or the p-polarization component will be diffracted out by the polarization hologram. The so-

called parallel and perpendicular refractive indices claimed by the applicant (which are NOT in the claim) is really the refractive indices for the two orthogonal polarization components **the same as the cited reference**. The phrase "applicant's disclosed formulation does not take out the polarized light components in the +direction but rather uses the parallel and perpendicular refractive indexes combination to form the polarization hologram", (remark page 18 second paragraph) is **completely not making any sense**. Applicant being one skilled in the art will have at least such knowledge that the equations stated in claim 48 ensures that one of the polarized light (i.e.. s-polarized light) when diffracted by the hologram will result in destructive interference which therefore will be taken out.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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